California Energy Efficiency Policies from an IRP Perspective

Section I: Demand Conditions on the Electrical Infrastructure

1. **Peak electric consumption is the critical feature and weak point of the CA electrical infrastructure**.[1]

The summer of 2004 had seven record setting peak load days (all over 44,000 MW). In spite of moderate temperatures, California ISO set a new system peak of 45,597 MW on September 8, 2004.[2]

The California Energy Commission concludes[3]:

- ISO Peak demand records were set 7 times in spite of average weather conditions.
- Peak demand was at a level projected for 2006.
- Insufficient reserves were available in Southern California on September 10, 2004.
- Southern California: Available capacity does not satisfy operating reserves under hot weather conditions (10% probability).

The situation in 2006 and beyond is worse as shown in Figures 1 and 2.

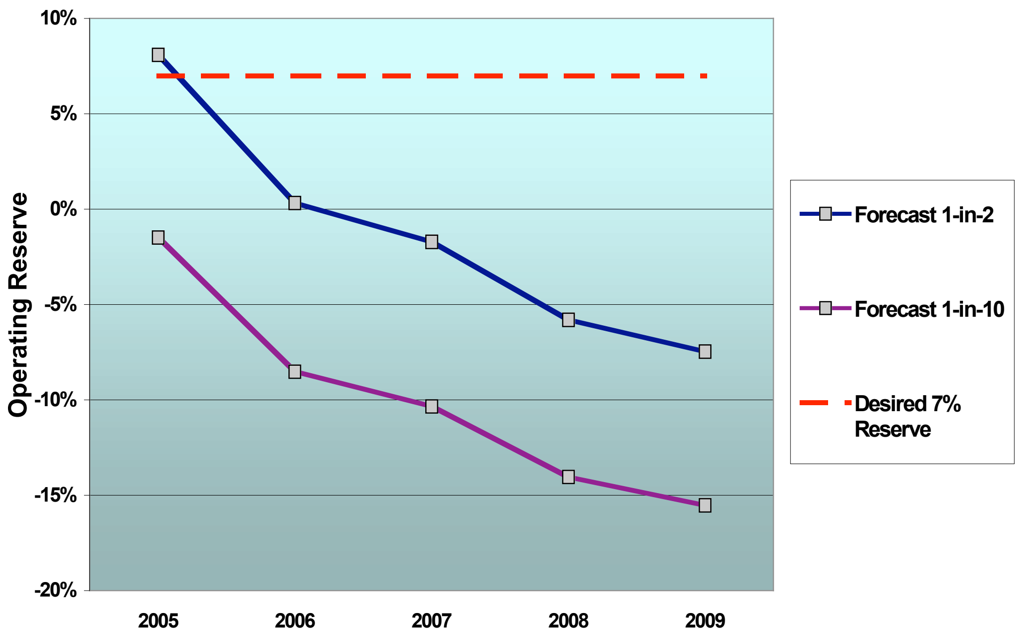


Figure 1. 2005-2009 Reserve Northern California

[1] Item #1 is from the Opening comments of Proctor Engineering Group, LTD, Applications 05-06-004, -015, -016, Applications of PG&E, SCE, and SDG&E for approval of the 2006-08 EE Programs and Budgets, dated June 30, 2005 Proctor Engineering's information and data is from the Cal ISO and CEC documents referenced in footnotes 2 and 3.

[2] *ISO Outlook Summer 2005 and Beyond* Presentation to the Senate Energy, Utilities and Communications Committee, February 22, 2005 by Jim Detmers, Cal ISO

[3] *California's Electricity Situation: Summer 2005* Presentation to the Senate Energy, Utilities and Communications Committee, February 22, 2005

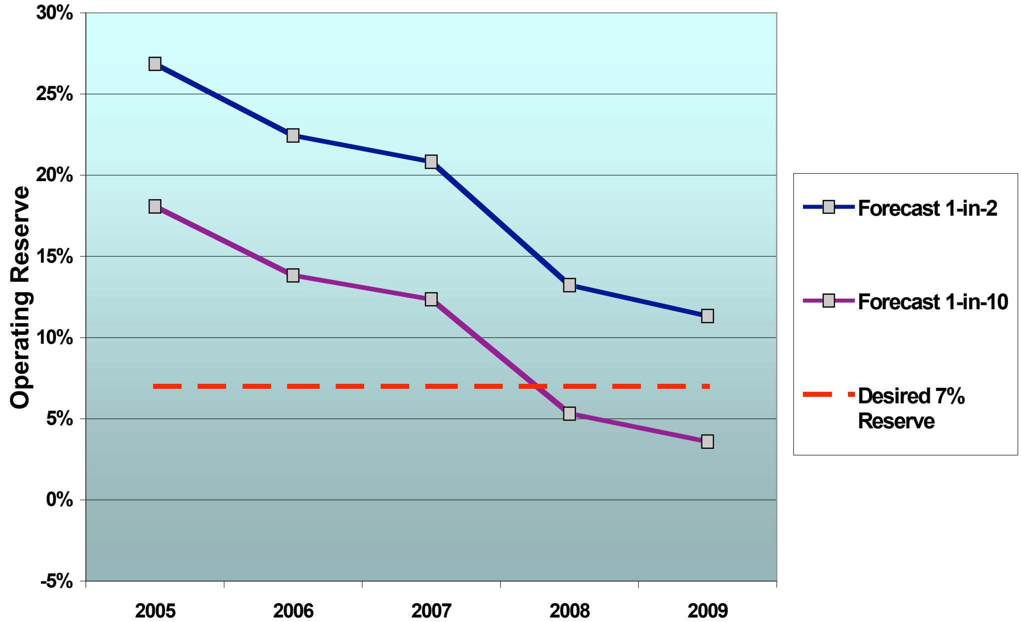


Figure 2. 2005-2009 Reserve Northern California

2. Peak consumption is growing more rapidly than average annual consumption.

California's peak demand is growing more rapidly at 2.4 percent annual (roughly the equivalent to three new 500-megawatt power plants) than the annual growth rate in energy consumption at 2% (2000 data).

The relationship between annual energy use and peak demand (load factor[4]) is deteriorating.

CA Electric IOUs System Load Factors (%)

	2000	2004	2008	2000 to 2008
SCE		54.7		
PG&E	55.6	56.7	55.0	**-0.60**
SDG&E	63.6	57.3	56.2	**-7.40**

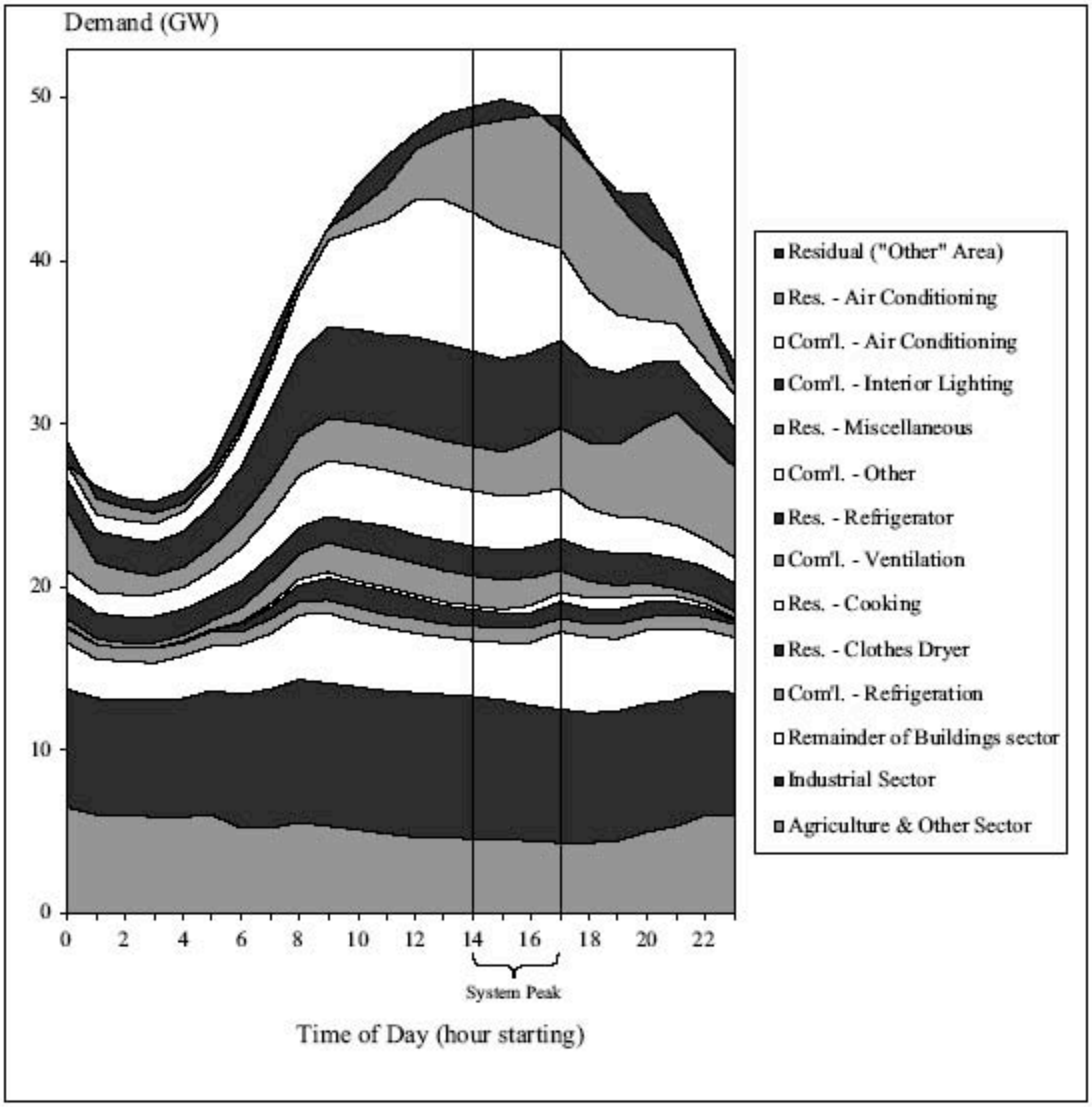
Notes:

SCE: data not yet provided.

[4] Load factor: The ratio of the average load supplied during a designated period to the peak or maximum load occurring in that period. (annual, seasonal, daily).

3. Residential air conditioning, followed by commercial air conditioning and lighting, are the largest contributors to California's peak demand[5]

California is a summer peaking state; that is, the maximum amount of electricity needs occurs during the hottest days of the summer. Electricity to provide cooling and ventilation of residential and commercial buildings accounts for the largest share of peak demand, roughly one-third of total, or approximately 16,000 MW of peak demand in 1999 (w/ residential AC approximately 7,500 Mw, and commercial approximately 8,500 or 47/53% split).



Source: Brown and Koomey 2002.

5 http://www.cpuc.ca.gov/static/industry/electric/energy%2Befficiency/rulemaking/natlgassvgsstudies.htm
CA Statewide Residential Sector Energy Efficiency Potential Study, Kema-Xenergy, April 2003.

2. **The strategic "least cost best fit (LCBF)" end uses are those that can increase overall capacity utilization and lower peak loads through the deployment of low load factor/high critical peak saving measures.[6]**

End Use Equivalent Load Factors	
Residential space cooling	10%
Commercial space cooling	30%
Residential Lighting	60%
Commercial Lighting	55%

3. **The largest peak demand savings potential is in residential space cooling, followed by commercial space cooling and lighting.[7]**

Peak Demand Savings Potential (MW)	
Residential space cooling	55 to 67%
Commercial space cooling	30%
Residential Lighting	11 to 17%
Commercial Lighting	55%

[6] The CPUC's Energy Efficiency Policy Manual for Post-2005 Programs, Policy Rule II.5. provides that

> the Program Administrators should demonstrate in their program planning applications for PY2006-PY2008 how their proposed portfolio will aggressively increase overall capacity utilization and lower peak loads through the deployment of <u>low load factor/high critical peak saving measures.</u> (D.05-04-051, Attachment 3, emphasis added).

The Commission adopted this requirement in response to the arguments of TURN and Proctor Engineering that the preliminary IOU portfolios were overly reliant upon high energy-using measures, such as lighting, at the expense of critical peak impact end uses, such as HVAC. As TURN noted in our comments on the draft decision that preceded D.05-04-051, the relatively high load factor reflected in the Commission's adopted savings goals was providing the IOUs with an incentive to overemphasize high load factor lighting programs. The Commission responded, "the Rules should be modified to reflect the need to ensure reliability in the near term, by encouraging aggressive programs that target measures with most of their energy savings during peak time periods." (D.05-04-051, *mimeo*, p. 21).

[7] Kema-Xenergy potentials analysis, 2003.
http://www.cpuc.ca.gov/static/industry/electric/energy%2Befficiency/rulemaking/natlgassvgsstudies.htm

Section II: CA Electric IOUs 2006-08 Proposed EE Portfolios as a Procured Resource

1. Risk assessment of projected savings to likely to occur (verified and retained).

PG&E	Gwh	Mw	*SCE*	Gwh	Mw	*SDG&E*	Gwh	Mw
CPUC target	2,826	613	CPUC target	3,135	687	CPUC target	1,004	210
Projected savings	2,965	553	**Projected** savings	3,292	714	**Projected** savings	850	163
% of target	**105%**	**90%**	*% of target*	**105%**	**104%**	*% of target*	**118%**	**129%**
Likely Savings	2,066	406	**Likely** Savings	3,097	526	**Likely** Savings	939	93
% of target	**73%**	**66%**	*% of target*	**99%**	**77%**	*% of target*	**110%**	**94%**

The likely savings adjustments are:

- Net out 90% of residential lighting demand savings from peak demand, given the data reporting that only about 10% of residential lighting is coincident with the daily summer peak.[8]
- Adjust the portion of projected annual energy savings attributable to residential and commercial lighting efficiency based on a limited and conservative risk analysis to underlying key variables.[9]

[8] Reference for 90% residential lighting savings not coincident with peak demand: *Lighting Efficiency Technology Report*, *Volume I, California Baseline.* California Energy Commission, September 1999, P400-98-004VI, Figure 2-34, p. 44. www.energy.ca.gov/efficiency/lighting/VOLUME01.PDF.

[9] The current net-to-gross (NTG) ratios of 0.96 nonresidential and 0.80 for residential were adjusted to 0.75. Reference SCE PRG report page 5, citation to TechMarket Work team's may 27, 2005 draft report for the CPUC and PRGs urging caution in the use of the current default NTG ratios in the DEER database, noting that: "Certainly, when the program description indicates that a particular measure has a 40-50% market share, the default NTG assumption of 0.80 or 0.96 may not be reasonable." For more details see Opening comments of TURN , Applications 05-06-004, -015, -016, Applications of PG&E, SCE, and SDG&E for approval of the 2006-08 EE Programs and Budgets, dated June 30, 2005

2. Effect of proposed 2006-2008 EE Portfolios on system load factors.

	2000	2004	2008	% change 00-08
SCE				
w/out EE		54.7		
with EE				
difference				
PG&E				
w/out EE	55.6	56.7	55.0	-0.6
with EE	56.7	51.9	44.6	**-12.1**
difference	1.1	**-4.8**	**-10.4**	
SDG&E				
w/out EE	63.6	57.3	56.2	-7.4
with EE	64.6	57.6	56.2	**-8.4**
difference	1.1	0.3	0.0	

SCE: Data not yet provided.

PG&E: Considerable erosion to load factor via energy efficiency.

SDG&E: Energy efficiency effect on load factor somewhat negative in 2000. Very slight improvement 2004; forecasted as “a wash” or no effect 2008

NOTE: The calculated system load factors with energy efficiency are based on the IOUs’ projected savings, which as shown in #1 above are of questionable reliability. Though additional analysis needs to be conducted to determine the effect on system load factors from a more likely to occur projection of EE savings, it appears that system load factors will drop further.

3. The 2006-08 Portfolios projected savings by key end uses relative to savings potential.

	Savings Potential % Total		2006-08 Projected % Total	
PG&E				
Residential	Mw	Gwh	Mw	Gwh
HVAC	**55%**	**11%**	**7%**	**7%**
Lighting	*17%*	*43%*	*86%*	*85%*
Commercial				
HVAC	46%	23%	46%	19%
Lighting	*43%*	*45%*	*13%*	*56%*
SCE				
Residential	Mw	Gwh	Mw	Gwh
HVAC	**56%**	**11%**	**5%**	**12%**
Lighting	*16%*	*42%*	*72%*	*72%*
Commercial				
HVAC	46%	23%	43%	22%
Lighting	*43%*	*45%*	39%	40%
SDG&E				
Residential				
HVAC	**67%**	**11%**	**1%**	**0%**
Lighting	*11%*	*41%*	*63%*	*89%*
Commercial				
HVAC	46%	23%	4%	9%
Lighting	*43%*	*45%*	*51%*	*38%*

Notes:

The projected space cooling and lighting savings are “backwards, or flipped” in relation to the potential savings.

Residential space cooling peak demand savings potential ranges from 55 to 67% of the projected residential category savings --- while projected residential peak demand space cooling savings are only 1 to 7%.

Projected residential lighting demand savings range from 63 to 86% --- even though residential lighting peak demand savings potential is only 11 to 17% of the residential category savings.

4. Screw-in CFLs as a percentage of the IOUs' proposed 2006-08 Portfolios.

	Gwh	Mw
SCE	14%	39%
PG&E	27%	30%
SDG&E	53%	48%

Note:
Screw-in CFLs are a particularly risky investment because of the magnitude intended to be relied upon for Gwh and Mw savings. Because screw-in CFLs have relative short useful lifes, uncertainity as to consumer application (i.e. placement of fixture and hours of operation), and uncertainty as to acceptance and persistency (or retention over time) --- relative to other more permanent and long-lived EE measure installations --- they can not be relied upon to the same extent as other measures such as a high efficiency refrigerator, or a high efficient central HVAC system. Also problematic is that fact that because almost all of the screw-in CFLs are in the residential category, the projected Mw impacts of screw-in CFLs is misleading because only about 10% of residential lighting energy use is coincident with the daily summer peak.[10]

Section III. Energy Efficiency Policy Observations from an "IRP" Perspective

1. Too much risk in planning for peak reserve adequacy is a very expensive proposition.[11]

When the reserve margin narrows because resources are not reliable, the cost of electricity increases. This occurrence makes the State vulnerable to predatory practices and endangers the productivity of the millions of workers in our state's economy. When outages occur, the losses are incalculable. Thus, for EE to be relied upon in IRP, the risk that projected savings will not materialize or will not be persistent must be closely managed through prudent EE portfolio design.

2. Providing the infrastructure for high peaks that swing more than 60% above the base usage is an economic hardship on utility ratepayers and the State's economy.

SCE 2006 GRC Mr. Fohrer: Historical perspective: CA Electric Rate Levels

"In addition, CA's moderate climate, strong building codes, and utility EE programs have constrained electricity consumption to a point where per-capita electricity consumption is one of the lowest in the nation. In conjunction with increasing penetration of air conditioning use, these factors have caused customer loads to be relatively low on average but also very 'needle peaked'. As a result, SCE's system 'load factor' has declined steadily for decades and is one of the lowest in the nation. Consequently, the high fixed costs invested for power supply and delivery infrastructure must be collected through fewer kwh sales, thereby creating high rates when measured on a per-kwh basis." (page 8, lines 5-13

[10] Ibid 8.
[11] Ibid 1.

3. **Further erosion of already deteriorating utility system load factors through ratepayer-financed energy efficiency programs is bad public policy.**

From an integrated resource procurement perspective, permitting the CA electric IOUs to dig deeper for energy efficiency by shoveling away at high-load factor use lighting, while whittling at low load factor/high critical peak saving measures[12] such as residential space cooling, (and in general skirting large year-round loads such as refrigerators), is akin to cutting off your nose in spite of your face.

4. Allowing critical peak load to go virtually unchecked ensures that not only will system infrastructure costs will continue to spiral upward, but that residential customers will bear the brunt of cost responsibility.

The Commission's Energy Efficiency Policy Rule II.3. provides that:
By keeping energy resource procurement costs as low as possible through the deployment of cost-effective portfolio of resource programs, *all* customers will share in the resource savings from energy efficiency. (D.05-04-051, Attachment 3) (original emphasis).

While this is a generally correct statement, energy efficiency will only offset more costly supply-side resources if the timing and magnitude of projected savings are correlated to supply-side procurement needs. At best, indiscriminate saving of energy will take a while to average out to some real supply-side offsets. In the meantime, residential customers will continue to be tagged with peak load cost of service allocations for their very costly air conditioning load because of the inadequate emphasis placed on residential HVAC in the three electric IOUs' portfolio plans.

While the discussion to date on distributional equity has almost exclusively focused on the allocation of energy efficiency funds among customer categories, funding allocation should be also be viewed as one of the key means of affording all customers an opportunity to not only realize participant energy savings, but to meaningfully effect customer category cost of service.

Thus, this notion of distributional equity in energy efficiency funding goes further than the generalized notion of compensation. Rather, distributional equity refers to not only equitable allocation of funds, but also an equitable allocation of customer-sector specific energy saving contributions to critical loads that are verified and sustained. All customers should be afforded the opportunity to reduce their contribution to utility procurement costs through energy efficiency programs and activities. The IOUs proposed portfolios with minimal at best space cooling savings do not provide residential customers with this opportunity.